

CLAIMS

1. A multi-output DC-DC converter comprising first to nth (n: an integer of 2 or more) output circuits for receiving an input DC voltage and for outputting first to nth output DC voltages, a switching circuit, an inductor and a control circuit, wherein

said switching circuit has an ON state, in which said input DC voltage is applied to said inductor and magnetic energy is stored, and has first to nth OFF states, in which said magnetic energy is released to one of said first to nth output circuits,

said control circuit is configured to distribute the switching cycles of said switching circuit to first to nth outputs to be controlled and to detect said first to nth output DC voltages, and further configured, in the case when one switching cycle of said switching circuit is used to control a kth ($1 \leq k \leq n$) output, to select a kth OFF state after the period of said ON state is adjusted so that said kth output DC voltage becomes a predetermined value and to maintain said kth OFF state until the release of said magnetic energy stored in said inductor to said kth output circuit is completed.

2. A multi-output DC-DC converter in accordance with claim 1, wherein said control circuit is configured to shift said kth OFF state to said ON state after the release of said magnetic energy stored in said inductor to said kth output circuit is completed.

3. A multi-output DC-DC converter in accordance with claim 2, wherein the switching cycle of said switching circuit or the period from said first to nth OFF state is not smaller than a predetermined value.

4. A multi-output DC-DC converter comprising first to nth (n: an integer of 2 or more) output circuits for receiving an input DC voltage and for outputting first to nth output DC voltages, a switching circuit, an inductor and a control circuit, wherein

 said switching circuit has an ON state, in which said input DC voltage is applied to said inductor and magnetic energy is stored, and has first to nth OFF states, in which said magnetic energy is released to one of said first to nth output circuits, said control circuit is configured to distribute the switching cycles of said switching

circuit to first to nth outputs to be controlled and to detect said first to nth output DC voltages, and further configured, in the case when one switching cycle of said switching circuit is used to control a kth ($1 \leq k \leq n$) output, to select a kth OFF state after the period of said ON state is adjusted so that said kth output DC voltage becomes a predetermined value and to select an OFF state other than said kth OFF state when said kth output DC voltage exceeds a predetermined upper limit value.

5. A multi-output DC-DC converter in accordance with claim 4, wherein the operation thereof is stopped when all of said 1st to nth output DC voltages exceed their upper limit values having been set respectively.